

1 CLAIMS:

SUB A 1-3
2 1. A method of removing at least some of a material from a
semiconductor substrate, comprising:

4 feeding a feed gas through an ozone generator to generate ozone
5 from the feed gas; the feed gas comprising at least 99.999% O₂ (by
6 volume); and

7 contacting the ozone or a fragment of the ozone with a material
8 on a semiconductor substrate to remove at least some of the material
9 from the semiconductor substrate.

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11 2. The method of claim 1 further comprising irradiating at least
12 some of the ozone with ultraviolet light prior to the contacting.

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14 3. The method of claim 1 further comprising irradiating at least
15 some of the ozone with ultraviolet light proximate the material.

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17 4. The method of claim 1 wherein the material on the
18 semiconductor substrate is photoresist.

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20 5. The method of claim 1 further comprising mixing the ozone
21 with water vapor prior to the contacting.

1 6. The method of claim 1 further comprising mixing the ozone
2 with an organic solvent vapor prior to the contacting.

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4 7. A method of removing at least some of a material from a
5 semiconductor substrate, comprising:

6 feeding a feed gas through an ozone generator to generate ozone
7 from the feed gas; the feed gas comprising O₂ and less than or equal
8 to 0.001% N₂ (by volume); and

9 contacting the ozone or a fragment of the ozone with a material
10 on a semiconductor substrate to remove at least some of the material
11 from the semiconductor substrate.

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13 8. The method of claim 7 further comprising irradiating at least
14 some of the ozone with ultraviolet light prior to the contacting.

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16 9. The method of claim 7 wherein the material on the
17 semiconductor substrate is photoresist.

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19 10. The method of claim 7 further comprising mixing the ozone
20 with water vapor prior to the contacting.

1 11. The method of claim 7 further comprising mixing the ozone
2 with an organic solvent vapor prior to the contacting.

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4 ~~Sub 3~~ 12. A method of removing at least some of a material from a
5 semiconductor substrate, comprising:

6 forming a mixture of ozone and organic solvent vapors in a
7 reaction chamber; and

8 contacting at least some of the ozone and solvent vapors with a
9 material on a semiconductor substrate to remove at least some of the
10 material from the semiconductor substrate.

11
12 13. The method of claim 12 wherein the material on the
13 semiconductor substrate is photoresist.

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15 14. The method of claim 12 wherein the material on the
16 semiconductor substrate is photoresist; wherein the semiconductor
17 substrate comprises Al_2O_3 ; and further comprising exposing at least some
18 of the Al_2O_3 to the ozone during the contacting.
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1 15. The method of claim 12 wherein the material on the
2 semiconductor substrate is photoresist; wherein the semiconductor
3 substrate comprises platinum; and further comprising exposing at least
4 some of the platinum to the ozone during the contacting.

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6 16. The method of claim 12 further comprising providing a
7 reservoir of volatile organic solvent within the reaction chamber and
8 forming the solvent vapors from the volatile organic solvent.

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10 17. The method of claim 16 wherein the volatile organic solvent
11 is a liquid.

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13 18. The method of claim 16 wherein the volatile organic solvent
14 comprises acetone.

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16 19. The method of claim 16 wherein the volatile organic solvent
17 consists essentially of acetone.

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19 20. The method of claim 16 wherein the volatile organic solvent
20 comprises cyclohexanone.

1 21. The method of claim 16 wherein the volatile organic solvent
2 consists essentially of cyclohexanone.

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4 22. The method of claim 16 wherein the volatile organic solvent
5 comprises a mixture of cyclohexanone and PGMEA.

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7 23. The method of claim 16 wherein the volatile organic solvent
8 comprises propylene glycol.

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10 24. The method of claim 12 further comprising providing a
11 reservoir of volatile organic solvent within the reaction chamber and
12 heating the volatile organic solvent to form the solvent vapors from the
13 volatile organic solvent.

1 *8/24* 25. A method of removing at least some of a material from a
2 semiconductor substrate, comprising:

3 forming a mixture of ozone and organic solvent vapors in a
4 reaction chamber;

5 irradiating at least some of the ozone with ultraviolet light to form
6 ozone fragments from the ozone; and

7 contacting at least some of the ozone fragments and solvent vapors
8 with a material on a semiconductor substrate to remove at least some
9 of the material from the semiconductor substrate.
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11 26. The method of claim 25 wherein the material on the
12 semiconductor substrate is photoresist.
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14 27. The method of claim 25 further comprising providing a
15 reservoir of volatile organic solvent within the reaction chamber and
16 forming the solvent vapors from the volatile organic solvent.
17

18 28. The method of claim 27 wherein the volatile organic solvent
19 is a liquid.
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21 29. The method of claim 27 wherein the volatile organic solvent
22 comprises acetone.
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1 30. The method of claim 27 wherein the volatile organic solvent
2 comprises cyclohexanone.

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4 31. The method of claim 27 wherein the volatile organic solvent
5 comprises a mixture of cyclohexanone and PGMEA.

6
7 32. The method of claim 27 wherein the volatile organic solvent
8 comprises propylene glycol.

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10 33. The method of claim 25 further comprising providing a
11 reservoir of volatile organic solvent within the reaction chamber and
12 heating the volatile organic solvent to form the solvent vapors from the
13 volatile organic solvent.

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15 34. The method of claim 25 wherein the material on the
16 semiconductor substrate is photoresist; wherein the semiconductor
17 substrate comprises Al_2O_3 ; and further comprising exposing at least some
18 of the Al_2O_3 to the ozone fragments during the contacting.

1 35. The method of claim 25 wherein the material on the
2 semiconductor substrate is photoresist; wherein the semiconductor
3 substrate comprises platinum; and further comprising exposing at least
4 some of the platinum to the ozone fragments during the contacting.